

Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

F.M. 71

erve
41
F22

Commercial **FAMILY-OPERATED CATTLE RANCHES**

INTERMOUNTAIN REGION



1930-47



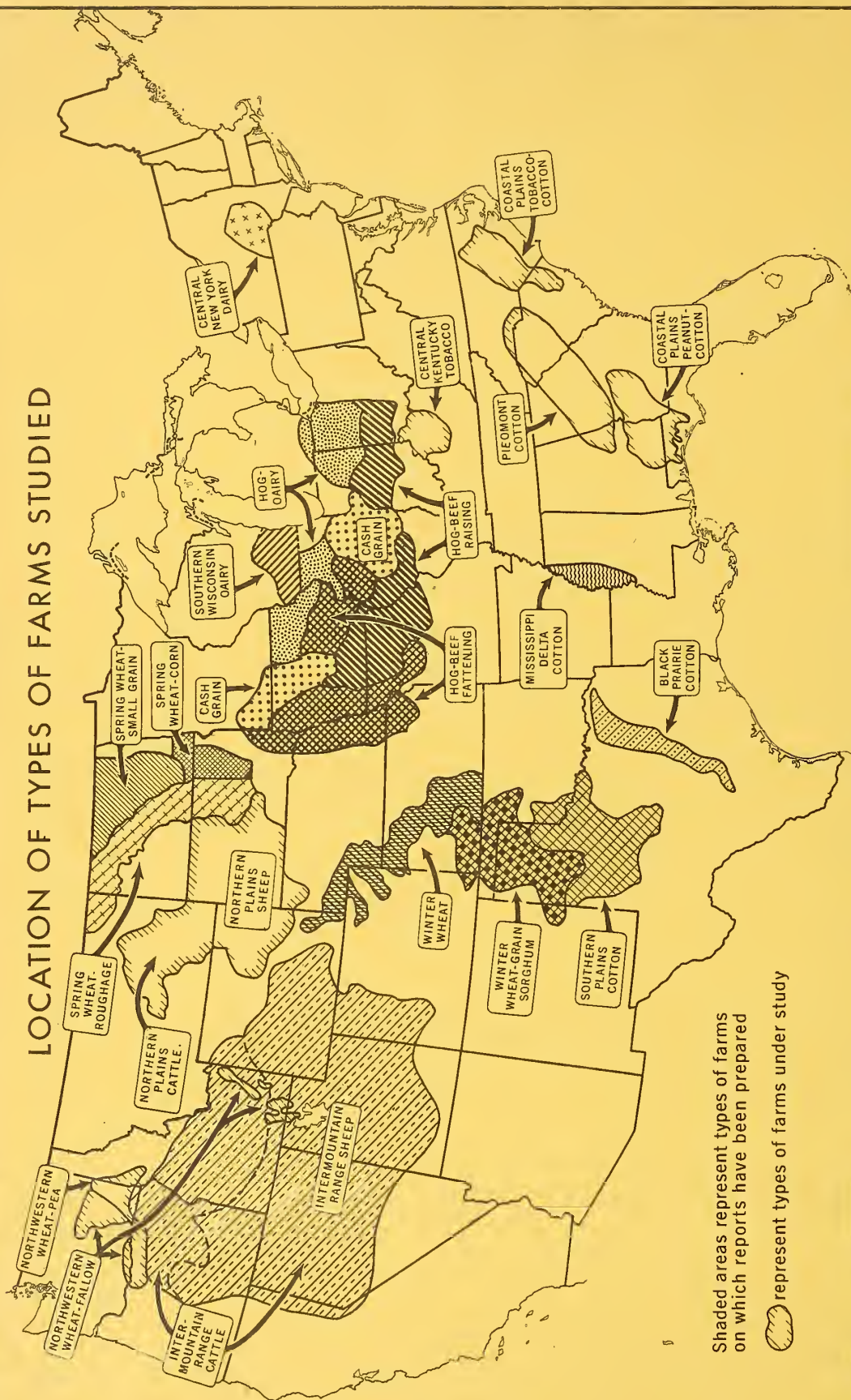
**ORGANIZATION, COSTS,
AND RETURNS**

LIBRARY
CURRENT CONTENTS
JAN 11 1943
U.S. DEPT. OF AGRICULTURE

• UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF AGRICULTURAL ECONOMICS •

NOVEMBER 1948

LOCATION OF TYPES OF FARMS STUDIED



Studies have been completed for 15 types of farms and results from those of the 9 other types indicated will soon be available. It is planned that all analyses will be kept current to provide a continuing source of information on the various details of farm organization, operation, income and costs. Other types of farms are found in these geographic areas, but in each case the type studied is the most important one.

COMMERCIAL FAMILY-OPERATED CATTLE RANCHES,
INTERMOUNTAIN REGION, 1930-47
ORGANIZATION, COSTS, AND RETURNS

By H. R. Hochmuth and Wylie D. Goodsell
Agricultural Economists 1/

INTRODUCTION

This is a statistical summary of adjustments and changes in ranch organization, investment, income, and expense from 1930 to 1947 on commercial family-operated cattle ranches in the Intermountain region. The study upon which this report is based is a portion of a Nation-wide study of commercial farms and ranches by types and sizes in important farming regions of the United States. Objectives, methodology, procedure, and terms used in this report are comparable to those used in other studies of which this report is a part. An example of these reports is "Typical Family-Operated Farms, 1930-45. Adjustments, Costs and Returns," issued by the Bureau of Agricultural Economics in April 1946 as F.M. 55.

The body of this report contains selected summary tables and graphic interpretations with a minimum of discussion. The appendix includes a detailed discussion of terms used. This particular report deals specifically with the group of cattle ranches that range in size from 50 to 600 head of cattle. This size range spans the practical limits of commercial family-operated cattle ranches; it includes approximately 90 percent of the cattle ranches in the area. About 50 percent of all commercial farms in the region are classified as livestock farms. Subsequent reports will present similar details for small and large sized family-operated cattle ranches. Companion reports will present similar information for sheep ranches.

The Intermountain range-livestock area covered in this report extends north and south from central Idaho and the southern boundaries of Washington and Montana almost to the southern borders of Utah and Nevada, and east and west from western Colorado and central Wyoming to central Oregon and the four California counties that bound northwestern Nevada (fig. 1). The area is characterized by vast stretches of grassland and brush-covered areas surrounding occasional mountain ranges which support timber of varying densities. These grassland and brush areas furnish winter and spring-fall grazing; and the mountains the summer grazing. Among or adjacent to the mountains nestle small fertile valleys in which irrigated crops are grown.

These grazing lands, both private and public, vary considerably in type and productivity. The grazing season is much shorter on those lands that are situated on the high plateaus and mountains as compared with those that lie in the mountain valleys on the foothills and the lower areas. The average grazing capacity of these lands ranges from about 2 to 10 or more acres per animal-unit month. It varies largely with elevation and with the amount and distribution of precipitation.

Irrigated fields of a wide variety of crops in the valley floors present the design of a patchwork quilt. Most of the specialty crops are sold directly for cash and they are not a part of the ranch livestock organization. They make up the "crop specialty" farms and part of the "general" farms that are found only in the valleys. Much of the hay land and some of the acreage of small grains, however, are included in the ranch organization. These lands supply pasture and winter feed for the livestock enterprises. The range-livestock economy of this region is based upon the interdependent relationship of irrigated hay lands and the large acreages of private and public range lands. In this region is produced much of the feeder livestock for the feeding lots of the Pacific Coast and the Midwest.

1/ The assistance and cooperation of the Agricultural Experiment Station, Utah State Agricultural College, is gratefully acknowledged.



U.S. DEPARTMENT OF AGRICULTURE

NEG. 46979 BUREAU OF AGRICULTURAL ECONOMICS

Figure 1.- The Intermountain region contains large acreages of open range lands used for grazing livestock. Interspersed irrigated areas produce considerable hay and specialty crops; the hay is used chiefly to maintain range cattle during the winter feeding season. Other types of farming are found in the area, but extensive grazing of cattle and sheep forms the characteristic agricultural pattern.

Data in this report apply to commercial family-operated cattle ranches only. It excludes part-time livestock enterprises and large-scale ranches which hire most of the labor and which are considered too large to be managed and operated mainly by the ranch operator and his family. Data were drawn from many sources. Chief among these were: Crop and livestock correspondent records of the Bureau of Agricultural Economics, farm- and ranch-management records and studies of the State colleges, production rates developed by State colleges, livestock trend sheets of the Production Credit Associations of the Farm Credit Administration, licensed and permitted use records and commensurate property records of the Bureau of Land Management and the Forest Service, the many agricultural statistics compiled by the Bureau of Agricultural Economics and other agencies of the United States Department of Agriculture, data relating to individual ranches classified by type and size from the United States Census of Agriculture, and from field surveys. Only data pertaining to bona fide cattle ranches within the specified size groups were used.

Ranch Size and Type

Various measures may be used to determine farm or ranch size. In strictly farming regions, crop acreage, numbers of dairy cows, and gross income are acceptable. In the range-livestock region, crop acreage as a measure of size is not usable. The basic measure for size is not usable. The basic measure for size of cattle ranch is number of livestock that are managed and produced on each ranch. Numbers of cattle managed on these ranches are associated to a high degree with income or value of products produced, consumed, and sold. In the public range States, total acreage as a measure of size is not altogether acceptable. Much forage is obtained from public lands and the number of livestock sometimes depends upon the size of the public grazing permit. The size of the public grazing permit may have no direct relationship to the acreage of land owned. It may be due to prior use of the range, location of ranch, control of water, condition of the range, demand for grazing permits, and land commensurability (extent of range land and cropland owned).

Determination of the type of farm or ranch is based on the magnitude of the primary enterprise. On cattle ranches, the primary enterprise is range beef cattle and the major portion of the gross income is derived from sales of livestock and livestock products. If much income is derived from sources other than range beef cattle, the ranch ceases to be a range-cattle enterprise and becomes a mixed cattle and sheep ranch or a general farm with a cattle enterprise, or the farm is a livestock operation with a significant cattle-feeding enterprise.

Most commercial family-operated cattle ranches have some crop enterprises and also some supplementary livestock enterprises. Hay is the main single crop enterprise. This is fed largely to the livestock produced on the ranch. Some concentrate feeds are produced and an occasional specialized crop is grown, particularly on the smaller ranches. Most of the produce of these specialized crops and that of some of the supplementary livestock enterprises are sold.

Table 1 shows the number of cattle ranches in the area in 1940, with specified numbers of cattle and proportion of the total income from the livestock enterprise. As many bona fide cattle ranches have supplementary enterprises and income from sources other than cattle, it appeared reasonable to include in the study ranches having some of these combinations. As income is the best single measure of size of enterprise that is appropriate to all enterprises, proportion of income was used to set the limits of tolerance. With consideration to various types of farms, sources of income, and variations in organization of cattle ranches in the Intermountain area, it was decided that 60 percent of the total income from livestock would be the lower limit considered for livestock ranches. But the major emphasis and portion of income on each ranch must be from the cattle enterprise.

In order to be included in the study each ranch had to meet certain other requirements with respect to types of livestock, crop acreages and use of land with respect to livestock and a number of other factors relating to cattle ranch organization and management. Sheep ranches and cattle and sheep combination ranches (those with high proportions of both sheep and cattle) cattle feeders, and units with considerable mixture of sheep, cattle, and hogs were eliminated. As a result, all farming units with less than 50 head of cattle and many with less than 100 head of cattle were eliminated from this study.

Table 1.- Cattle farms: Number of farms by number of cattle in herd and percentage of income from livestock, Intermountain region, 1940 1/

		Number of ranches with size of herd of-																																
Income from live-stock	Total number of ranches	0-25	25-50	50-75	75-100	100-150	150-200	200-250	250-300	300-350	350-400	400-450	450-500	500-550	550-600	600-650	650-700	700-750	750-800	800-850	850-900	900-950	950-1,000											
		24	49	74	99	149	199	249	299	349	399	449	499	549	599	649	699	749	799	849	899	949	999	& over										
Percent:	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.										
1-20																																		
21-25	2	1																																
26-30	4	3																																
31-35	11	6																																
36-40	30	17	10																															
41-45	33	13	12	6																														
46-50	58	23	14	2	7																													
51-55	96	34	27	9	7	7	13	2	2	1																								
56-60	89	29	22	9	11	8	8	4	3	1	1																							
61-65	76	27	22	7	6	6	8	2	2	2	1																							
66-70	87	24	21	11	8	7	7	5	3	3	1	2	2																					
71-75	71	19	26	9	5	7	7	1	2	1	1																							
76-80	78	17	9	13	7	7	7	2	5	6	1	2	2																					
81-85	94	22	19	8	10	11	7	7	6	3	1	1	1																					
86-90	108	17	20	16	7	13	8	10	5	7	3	1	1																					
91-95	130	20	9	15	12	20	12	10	6	5	4	4	1	4	1	1	1	9	2	5	3	5	3	6										
96-100	723	148	86	78	42	89	50	39	27	38	12	17	11	19	4	7	9	2	5	3	5	3	6	23										
	1,690	420	301	183	124	193	95	86	53	55	25	27	15	28	6	8	9	3	5	5	5	7	32											

1/ Obtained from a sample of livestock ranches in the area. U. S. Census of Agriculture, 1940. This table includes all farming units in the sample on which the major source of income was from cattle, sheep and hogs and on which cattle was the important enterprise. All units listed are not bona fide cattle ranches.

Therefore, for the purposes of the study, a cattle ranch is defined as a livestock organization in which the major emphasis is the grazing and production of cattle and from which at least 60 percent of the gross value of production is from livestock. Livestock in this instance includes cattle, sheep, and hogs, but it does not include other livestock or livestock products. The average family cattle ranch does not have a sheep enterprise but frequently a one-band sheep ranch has a small beef enterprise. Mixed cattle and sheep ranches usually are too large to be classified as family-operated ranches.

A major objective of these studies of commercial family-operated farms and ranches by type and size is to compare directly the income, costs, and related items from type of farm to type of farm, and from one farming area to another. A standard measure of the practicable limits of commercial family-operated farms and ranches has been determined and applied uniformly from farming area to farming area. ^{2/} The practicable limits of commercial family-operated cattle ranches in this area ranged from 50 to 600 head of cattle of all ages on ranches January 1, 1940.

RANCH ORGANIZATION

Physical Conditions

The western range-livestock industry is subject to the vagaries of weather. When precipitation is low for a series of years, the industry suffers badly; supplies of water and yields of hay are low; the range produces little forage; the condition of the range stock is poor; and forced liquidation of herds becomes inevitable. During the period 1930-36, production conditions were generally poor; precipitation was low as were also yields from range and hay (fig. 2). Fortunately for the operators and the industry, the 1940's and the war years were a series of highly productive years. Increased precipitation and favorable crop and range conditions permitted herds to expand. The excellent physical conditions during the 1940's, coupled with favorable prices, lifted cattle ranches from the depths of economic and climatic depression to a reasonably favorable position.

Land and Crops

Total private land in the family-operated cattle ranches rose from an average of 1,200 acres in the 1931-34 period, to more than 1,700 acres during the war and postwar period (table 2). Total acreage operated follows in a general way the total number of cattle operated. After the disastrous 1934-35 drought period, total acreage in ranches rose more rapidly than did animal units.

The measure of relationship between land operated and animal units operated is best shown on an acres-per-animal-unit basis. The period 1935-39 indicates the greatest year-to-year increase in acres per animal unit in the 18-year period. During this period, herds had not recovered from the deep inroads made by enforced reduction in breeding stock due to the drought and depression. In addition, the range had not recovered from the effects of drought, and grazing capacity increased but slowly.

In all probability, the main incentive to increased acreage per animal unit was furnished by the Taylor Grazing Act in 1934. Commensurability requirements and administrative rulings made it advisable that the rancher acquire additional private land so his public land range privileges would remain valid. Table 3 and figure 3 indicate that the crop acres per animal unit remained the same and that the increase in acres per animal unit came in the range and pasture lands.

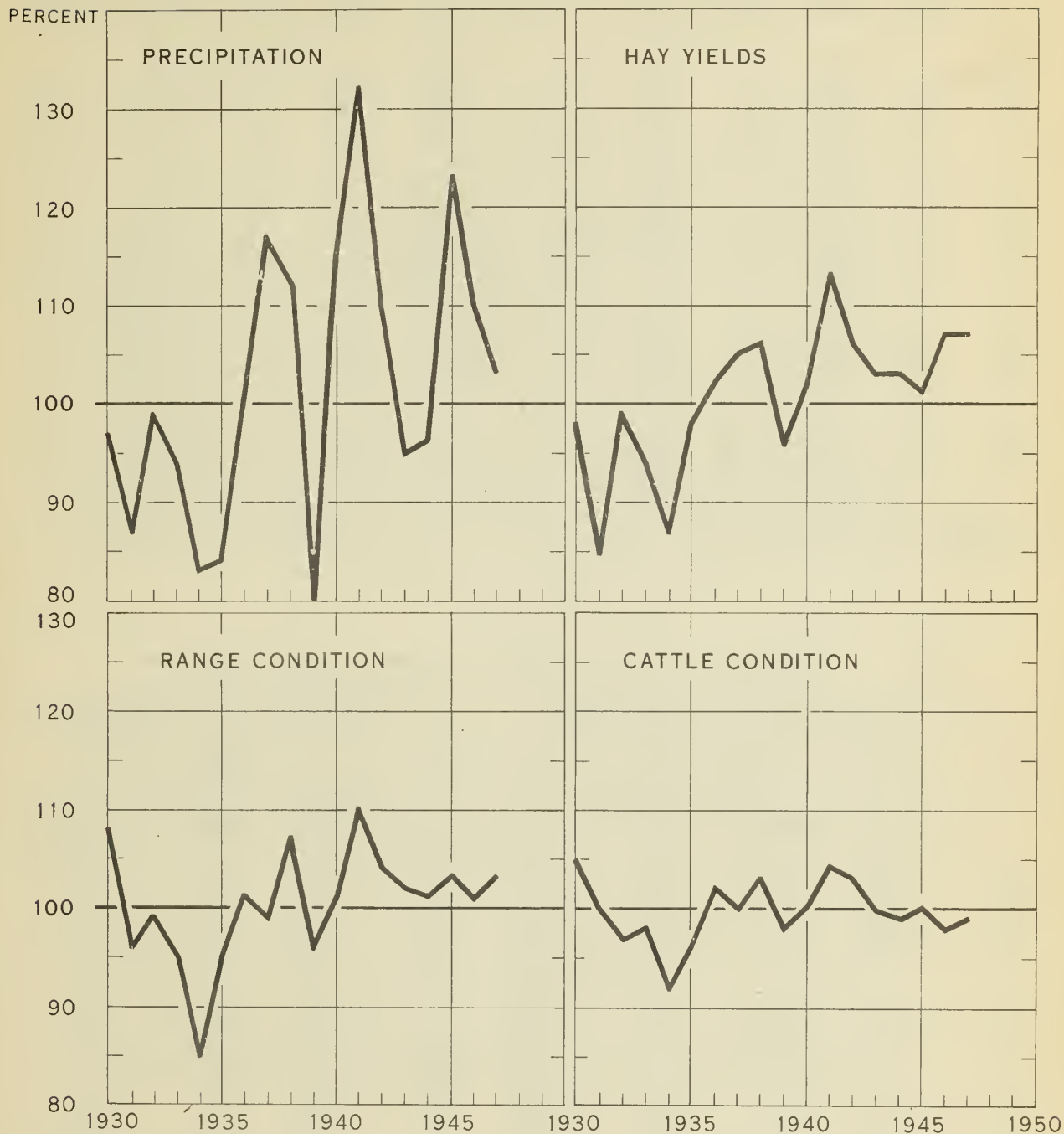
^{2/} The range in size limits of commercial family-operated, part-time, and large-scale farms and ranches was determined by a comprehensive analysis of 1945 Census schedules classified by type of farm in a large number of type-of-farming areas and for the United States. Three important criteria (value of products, value of land and buildings, and days of operator work off farm) were used to set the limits of the various economic classes of farms. In 1944, commercial family-operated farms generally included those farms which met the qualifications for type, which had value of products ranging from \$1,000-\$19,999, and on which the operator worked off the farm less than 100 days. Farms which began or discontinued (sold out) operations in the year enumerated were omitted.

Table 2.- Land use, livestock numbers, and distribution of income and expense
Family Operated Area Type Ranches, Intermountain Region, 1930-47

Item	Unit	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947
Total land in ranch	Acres	1,244	1,180	1,216	1,215	1,199	1,236	1,275	1,369	1,520	1,595	1,662	1,720	1,735	1,703	1,697	1,713	1,698	1,623
Proportion of ranch land in:																			
Cropland harvested	Percent	15	17	17	17	16	15	15	13	12	11	11	11	11	11	11	11	11	11
All other land	do.	85	83	83	83	84	85	85	87	88	89	89	89	89	89	89	89	89	89
Crops harvested																			
Grain	Acres	12.4	38.4	28.0	32.5	51.6	29.7	26.0	13.9	10.5	31.7	11.1	8.2	15.8	20.0	13.1	15.7	11.8	12.1
Hay	do.	177.8	160.7	173.7	168.9	138.8	156.3	158.3	166.4	168.1	148.9	172.5	183.8	175.0	172.6	178.8	177.0	176.5	166.9
Other crops	do.	0.8	1.0	1.4	1.6	1.8	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	2.9	2.8
Hay yield (Index 1930-44=100)	Percent	98	85	99	94	87	98	102	105	106	96	102	113	106	103	103	101	107	107
Livestock on ranch January 1:																			
Dairy cows	Number	6.5	5.2	6.7	6.7	5.6	5.9	5.3	5.5	5.6	5.3	4.7	5.0	5.3	5.9	5.5	4.9	4.5	4.4
Beef cattle	do.	205.4	211.8	215.1	214.2	214.5	198.1	198.2	188.5	182.9	199.7	201.2	207.1	211.1	211.0	211.6	208.2	204.0	200.4
All hogs	do.	2.4	2.1	2.9	0.8	1.6	1.5	1.7	1.7	1.6	1.8	1.6	1.8	2.2	2.6	2.6	1.8	1.9	2.8
Poultry	do.	37	26	23	23	26	36	33	33	33	31	33	39	38	45	42	38	37	44
Horses	do.	13.8	15.8	15.8	16.2	16.9	18.9	17.1	15.9	15.3	13.7	15.2	15.8	16.1	16.8	16.4	16.8	16.0	16.2
Ranches with tractors	Percent	11	13	14	14	14	15	18	21	26	28	31	35	41	44	45	48	51	55
Proportion of cash receipts from:																			
Crops	Percent	-	5	2	4	8	7	1	1	-	1	1	2	3	1	-	3	5	7
Livestock	do.	95	93	95	90	83	85	93	92	93	91	91	91	91	93	94	92	90	88
Livestock products	do.	5	2	3	3	3	4	3	4	3	3	2	3	3	3	2	2	2	2
Government payments	do.	-	-	-	3	6	4	3	3	4	5	6	4	3	3	4	3	3	3
Proportion of cash expenditures for:	Percent																		
Feed and seed	do.	7	10	17	23	23	7	16	10	7	7	7	8	9	9	9	9	8	8
Livestock	do.	20	8	6	9	9	11	5	8	21	21	13	11	16	16	14	11	5	7
Labor	do.	-	6	5	4	6	1	-	-	-	-	-	3	7	12	16	19	15	13
Power and machinery	do.	39	40	35	35	37	47	47	47	40	42	47	47	37	35	36	35	39	39
General farm	do.	29	32	34	25	22	30	28	30	28	26	29	26	25	22	20	21	27	29
Miscellaneous	do.	5	4	3	4	3	4	4	5	4	4	4	4	5	6	5	5	6	4

/1 Preliminary

PHYSICAL PRODUCTION FACTORS, 1930-47
 (FAMILY-OPERATED CATTLE RANCHES, INTERMOUNTAIN REGION)
 INDEX NUMBERS (1930-44=100)



U. S. DEPARTMENT OF AGRICULTURE

NEG 46980 BUREAU OF AGRICULTURAL ECONOMICS

Figure 2.- Range condition, cattle condition, and yields of forage crops are closely associated with rainfall. During the early 1930's precipitation was low and as a result production of hay and range forage was also low. The 1940's brought increased precipitation and better than usual hay yields and range conditions.

Table 3.- Total land in ranch and use of land. Family-operated cattle ranches, Intermountain region, 1930-47

Year	Cropland harvested per ranch					Range and pasture		Idle and waste	Total land	
	Grains	Hay	Other crops	Total	Crops per A.U.	Per ranch	Per A.U.		Per ranch	Per A.U.
	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres
1930	12.4	177.8	0.8	191.0	1.1	1,016.9	5.9	36.1	1,244	7.2
1931	38.4	160.7	1.0	200.1	1.1	946.9	5.2	33.0	1,180	6.4
1932	28.0	173.7	1.4	203.1	1.1	980.1	5.2	32.8	1,216	6.6
1933	32.5	168.9	1.6	203.0	1.1	979.2	5.3	32.8	1,215	6.6
1934	51.6	138.8	1.8	192.2	1.0	975.6	5.3	31.2	1,199	6.5
1935	29.7	156.3	2.0	188.0	1.1	1,017.1	5.8	30.9	1,236	7.0
1936	26.0	158.3	2.1	186.4	1.1	1,058.0	6.0	30.6	1,275	7.2
1937	13.9	166.4	2.3	182.5	1.1	1,154.9	7.1	31.5	1,369	8.5
1938	10.5	168.1	2.3	180.9	1.1	1,305.7	8.2	33.4	1,520	9.5
1939	31.7	148.9	2.4	183.0	1.1	1,378.5	8.3	33.5	1,595	9.6
1940	11.1	172.5	2.5	186.1	1.1	1,442.7	8.4	33.2	1,662	9.6
1941	8.2	183.8	2.6	194.6	1.1	1,492.7	8.3	32.7	1,720	9.5
1942	15.8	175.0	2.7	193.5	1.1	1,510.3	8.2	31.2	1,735	9.5
1943	20.0	172.6	2.8	195.4	1.1	1,480.4	8.0	27.2	1,703	9.2
1944	13.1	178.8	2.9	194.8	1.1	1,478.5	8.1	23.7	1,697	9.3
1945	15.7	177.0	3.0	195.7	1.1	1,496.7	8.4	20.6	1,713	9.6
1946	11.8	176.5	2.9	191.2	1.1	1,486.7	8.4	20.1	1,698	9.6
1947 <u>1/</u>	12.1	166.9	2.8	181.8	1.1	1,421.0	8.3	20.2	1,623	9.5

1/ Preliminary.

Table 4.- Distribution of animal-unit months of feed and forage by types of land Family-operated cattle ranches, Intermountain region, 1930-47

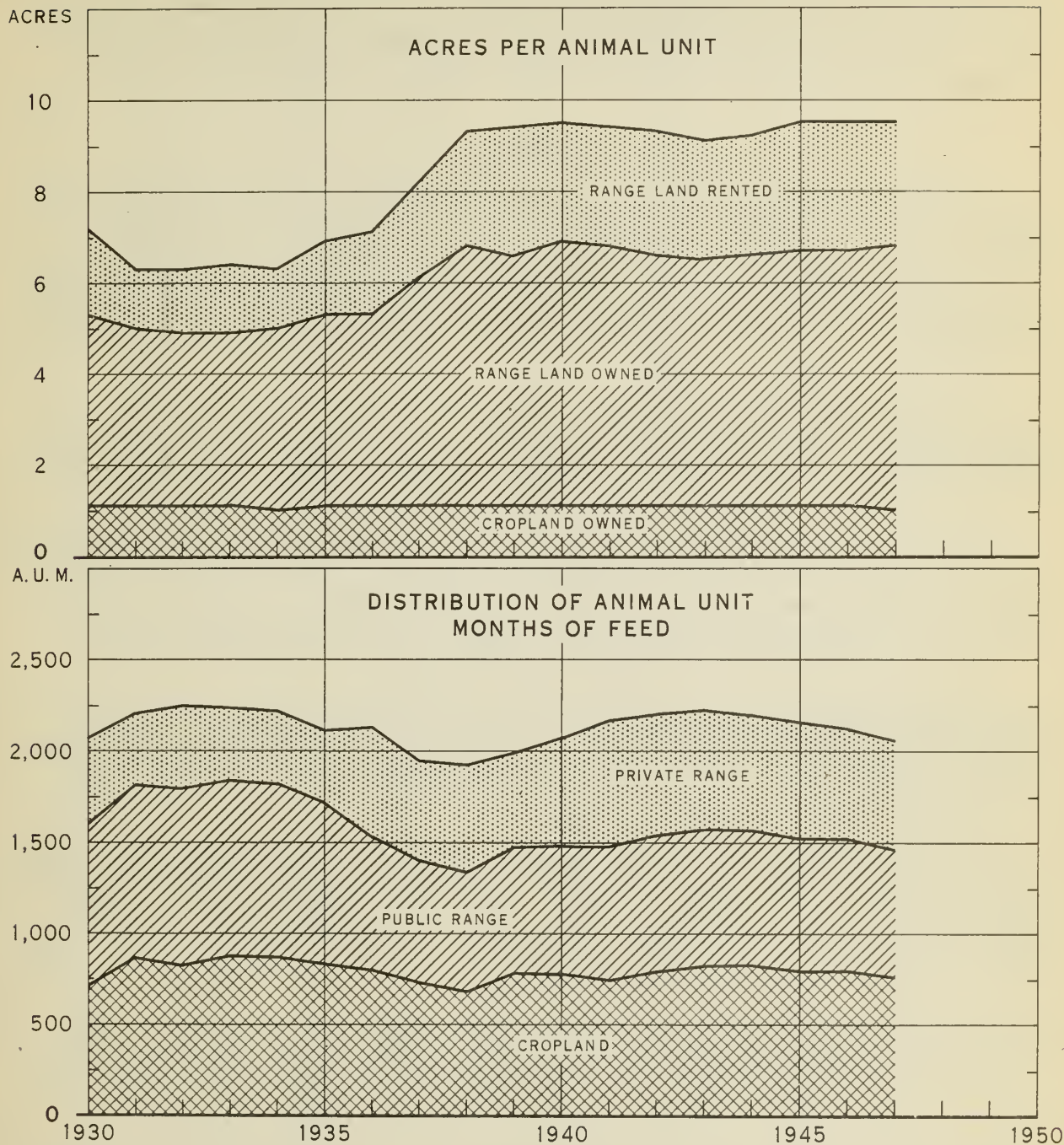
Year	Animal-unit month of feed per ranch				Percentage distribution of A.U.M.'s			
	Crop land	Range land		Total	Crop land	Range land		Total
		Public <u>2/</u>	Private			Public	Private	
	A.U.M.	A.U.M.	A.U.M.	A.U.M.	Percent	Percent	Percent	Percent
1930	706	895	464	2,065	34	43	23	100
1931	863	952	389	2,204	39	43	18	100
1932	822	975	449	2,246	36	44	20	100
1933	875	963	395	2,233	39	43	18	100
1934	869	951	398	2,218	39	43	18	100
1935	826	889	393	2,108	39	42	19	100
1936	797	731	597	2,125	37	34	29	100
1937	729	672	544	1,945	37	35	28	100
1938	673	662	587	1,922	35	34	31	100
1939	779	695	516	1,990	39	35	26	100
1940	776	706	588	2,070	37	34	29	100
1941	740	738	687	2,165	34	34	32	100
1942	788	747	663	2,198	35	34	31	100
1943	813	751	654	2,218	36	34	30	100
1944	821	742	627	2,190	37	34	29	100
1945	789	729	634	2,152	36	34	30	100
1946	794	720	603	2,117	37	34	29	100
1947 <u>1/</u>	752	702	597	2,051	37	34	29	100

1/ Preliminary.

2/ Public lands are federally owned. State lands are considered as patented private lands.

ACRES PER ANIMAL UNIT, AND DISTRIBUTION OF ANIMAL UNIT MONTHS OF FEED, 1930-47

(FAMILY-OPERATED CATTLE RANCHES, INTERMOUNTAIN REGION)



U. S. DEPARTMENT OF AGRICULTURE

NEG. 46981 BUREAU OF AGRICULTURAL ECONOMICS

Figure 3.- Use of cropland for feed and forage for cattle ranches has remained relatively stable. Ranchers have obtained more private range land in later years and they now obtain fewer animal-unit months of forage from public lands.

In the Intermountain region, cattle ranchers do not obtain all of their feed and forage from owned lands and lands leased from private owners. On an animal-unit-month basis ^{3/} more than 33 percent of the feed and forage of family-operated cattle ranches is obtained from Federal public lands (table 4). The percentage of animal-unit months of feed obtained from cropland and its aftermath has remained relatively stable. The shift in land use has occurred on the range lands. Use of the public range dropped from 43 percent in 1930-34 to 34 percent in 1940-47 with a parallel increase of use on private range lands. The decrease in use of public range land was caused by a combination of a slight reduction in numbers of livestock permitted and a larger reduction of animal-unit months of forage due to reduction in length of grazing season.

Livestock

For the 18-year period 1930-47, family-operated cattle ranches averaged about 210 head of all cattle. Maximum numbers were reached in 1932 and again during the war years (table 5). The low in numbers was reached in 1938 as an aftermath of the 1934-35 drought. This is an example of the difficulty faced by cattle producers when they are forced to liquidate their herds following several years of unfavorable forage conditions on the range. This reduction eats deeply into the breeding herd and often means reduced sales and income for a series of years until former livestock-breeding numbers again are attained.

The family-sized cattle ranch has about 16 head of horses, of which 14 head are colts and stock horses for saddle work. Normally, on a ranch of this size, 6 to 8 stock horses are more than sufficient. However, horses are a part of the western scene and ranchers generally keep more than are required to handle the cattle. Fewer horses would mean increased income as excess horses provide less economic return than do cattle.

On family-operated cattle ranches in this area, the average annual calf crop is approximately 70 percent. This means that, for every 100 cows and heifers 2 years old and over, 70 calves are dropped. The calf crop is closely associated with precipitation and range condition and condition of cattle, as would be expected. During the middle thirties, the drought years, the calf crop dropped to a low of 60 percent. During the war years, the calf crop averaged about 73 percent and in 1947, it was 79 percent.

The proportion of the total cattle herd has varied by age and sex to some extent, depending upon production and price conditions (table 6). During the period reported here the average cattle herd on January 1 consisted of about 47 percent cows, 11 percent heifers, 2 percent steers over 2 years, 10 percent yearling steers, 28 percent calves, and 2 percent bulls.

These age and sex classifications show some trends and some short-time shifts due to production irregularities. The percentage of steers over 2 years old has been reduced gradually. Normally, the number of breeding cows in the herd remains fairly constant if herd numbers are to be maintained. However, immediately following the drought years, breeding cows dropped to 42 percent of the total herd. When the trend in numbers turns downward breeding cows are reduced to fewer than are required to maintain the herd. When numbers are on the increase the reverse is true.

Death losses of cattle and calves averaged 8 animals a year (table 7). Of this death loss, 70 percent was in calves and 30 percent in older cattle. The drought years of the 1930's increased the death rate, particularly that of calves. The combination of a low calf crop and a high death loss of cattle during the drought years resulted in an abnormally low production of cattle during and immediately following that period.

Sales of cattle averaged 59 head a year (table 8). Cows and 2-year old steers made up the major portion of the sales, each accounting for about a third of the total number of cattle sold. Sales by sex and age classes vary by years; they depend upon livestock prices and conditions of production. Cattle ranches in the Intermountain region generally

^{3/} Animal-unit months refer to a time basis only. They make no comparison between quality and quantity of forage from various types of land.

Table 5.- Livestock on family-operated cattle ranches, January 1
Intermountain region, 1930-47
(Average number per ranch)

Year	Cattle and calves	Horses and colts	All hogs	Chickens	Animal units of livestock	Calf crop	Death loss		
							Cattle	Calves	
	Number	Number	Number	Number	Number	Percent	1/ Percent	2/ Percent	3/ Percent
1930	212.0	13.8	2.4	37	172.1	74	2.4	5.0	
1931	217.0	15.8	2.1	26	183.7	72	2.3	5.4	
1932	221.8	15.8	2.9	23	187.2	67	2.7	5.4	
1933	221.0	16.2	0.8	23	186.1	70	2.3	5.6	
1934	220.1	16.9	1.6	26	184.8	67	3.0	9.4	
1935	204.0	18.9	1.5	36	175.7	60	3.0	8.2	
1936	203.5	17.1	1.7	33	177.1	66	2.4	5.6	
1937	194.0	15.9	1.7	33	162.1	67	3.1	5.9	
1938	188.5	15.3	1.6	33	160.2	68	2.3	5.6	
1939	195.0	13.7	1.8	31	165.8	69	2.6	5.1	
1940	205.9	15.2	1.6	33	172.5	71	2.4	4.9	
1941	212.1	15.8	1.8	39	180.4	69	2.4	5.5	
1942	216.4	16.1	2.2	38	183.2	73	2.3	5.4	
1943	216.9	16.8	2.6	45	184.8	74	2.2	4.1	
1944	217.1	16.4	2.6	42	182.5	75	2.3	5.5	
1945	213.1	16.8	1.8	38	179.3	72	2.1	5.0	
1946	208.5	16.0	1.9	37	176.4	71	2.2	4.9	
1947 4/	204.8	16.2	2.8	44	170.9	79	2.2	4.5	

1/ Calculated as percentage of calves born of cows and heifers 2 years old and over.

2/ Percentage of January 1 inventory.

3/ Percentage of calves born.

4/ Preliminary.

Table 6.- Livestock inventory January 1, family-operated cattle ranches,
Intermountain region, 1930-47
(Average number per ranch)

Year	Cattle								Hogs						
	All cattle and calves	Milk cows 2 years & over	Beef cows 2 years & over	Heifers 1-2 years	Steers 2 years & over	Steers 1-2 years	Calves	Bulls	All hogs	Brood sows	Other hogs 6 mo. & over	Pigs under 6 mo.	All chick- ens	A 1 horses	
	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number
1930	212.0	6.6	82.2	24.9	12.8	19.2	62.9	3.4	2.4	0.3	0.9	1.2	37	13.8	
1931	217.0	5.2	96.3	23.2	3.9	28.9	55.3	4.2	2.1	0.3	1.0	0.8	26	15.8	
1932	221.8	6.7	96.7	24.5	7.5	25.7	57.0	3.7	2.9	0.6	0.8	1.5	23	15.8	
1933	221.0	6.7	93.9	24.6	7.1	27.5	57.0	4.2	0.8	0.1	0.3	0.4	23	16.2	
1934	220.1	5.6	91.0	28.4	9.8	24.8	56.3	4.2	1.6	0.2	0.8	0.6	26	16.9	
1935	204.0	5.9	92.0	21.4	—	23.0	58.0	3.7	1.5	0.2	0.8	0.5	36	18.9	
1936	203.5	5.3	95.3	21.9	9.1	17.0	50.4	4.6	1.7	0.2	0.7	0.8	33	17.1	
1937	194.0	5.5	80.2	21.9	10.1	16.0	56.9	3.4	1.7	0.2	0.7	0.8	33	15.9	
1938	188.5	5.6	78.9	24.1	15.3	14.2	47.0	3.4	1.6	0.2	0.7	0.7	33	15.3	
1939	195.0	5.3	88.7	26.7	1.9	20.9	47.5	4.0	1.8	0.2	0.8	0.8	31	13.7	
1940	205.9	4.7	95.4	24.3	8.1	12.0	57.4	4.0	1.6	0.3	0.5	0.8	33	15.2	
1941	212.1	5.0	103.1	22.9	0.3	15.5	61.3	4.0	1.8	0.3	0.6	0.9	39	15.8	
1942	216.4	5.3	101.6	24.0	1.3	18.8	61.5	3.9	2.2	0.4	0.9	0.9	38	16.1	
1943	216.9	5.9	100.2	23.0	3.5	19.0	61.1	4.2	2.6	0.5	1.0	1.1	45	16.8	
1944	217.1	5.5	98.8	22.7	—	20.9	65.2	4.0	2.6	0.3	1.3	1.0	42	16.4	
1945	213.1	4.9	97.8	23.7	—	17.7	64.9	4.1	1.8	0.3	0.7	0.8	38	16.8	
1946	208.5	4.5	93.0	23.0	—	20.9	63.1	4.0	1.9	0.3	0.7	0.9	37	16.5	
1947 1/	204.8	4.4	88.5	26.5	—	19.0	62.4	4.0	2.8	0.3	0.7	1.8	44	16.2	

1/ Preliminary.

Table 7.- Livestock production in current year, family-operated cattle ranches, Intermountain regions, 1930-37

Year	Cattle											
	Begin- ning	Calves born Of cows		Death loss		Pur- chased		Used on ranch	End inven- tory	Pigs raised	Chickens raised	
	inven- tory	2 years and over	Number	Cattle	Calves		Sold					
	Number	Percent	Number	Number	Number	Number	Number	Number	Number	Number	Number	
1930	212.0	74	65.4	5.1	3.3	0.9	51.6	1.3	217.0	0.9	26	
1931	217.0	72	72.9	4.9	4.0	1.4	59.2	1.4	221.8	1.0	17	
1932	221.8	67	69.3	5.9	3.8	0.6	59.1	1.9	221.0	0.8	15	
1933	221.0	70	68.4	5.0	3.8	1.0	59.6	1.9	220.1	0.5	15	
1934	220.1	67	65.7	6.5	6.1	---	66.0	2.2	204.0	0.8	18	
1935	204.0	60	58.5	6.1	4.8	2.0	48.9	1.2	203.5	0.8	24	
1936	203.5	66	66.4	5.5	3.7	0.9	66.1	1.5	194.0	0.8	23	
1937	194.0	67	57.8	6.0	3.4	1.2	53.8	1.3	188.5	0.8	23	
1938	188.5	68	57.5	4.3	3.2	5.2	47.0	1.7	195.0	0.7	23	
1939	195.0	69	65.3	5.1	3.3	3.2	47.7	1.5	205.9	0.8	22	
1940	205.9	71	71.0	5.0	3.5	1.7	56.4	1.6	212.1	0.7	23	
1941	212.1	69	75.0	5.1	4.1	1.3	61.5	1.3	216.4	0.7	27	
1942	216.4	73	78.2	5.1	4.2	1.6	68.0	2.0	216.9	0.9	25	
1943	216.9	74	78.5	4.7	3.2	1.8	71.2	1.0	217.1	1.0	30	
1944	217.1	75	78.4	5.1	4.3	1.6	72.8	1.8	213.1	1.3	30	
1945	213.1	72	74.0	4.5	3.7	1.5	70.7	1.2	208.5	0.8	28	
1946	208.5	71	69.0	4.7	3.4	0.2	62.8	2.0	204.8	0.8	27	
1947 1/2	204.8	79	73.4	4.3	3.7	1.0	66.6	1.0	203.6	1.4	36	

1/ Preliminary.

Table 8.- Proportion of cattle sold by class and average weight per head sold, family-operated cattle ranches, Intermountain region, 1930-47

Year	Cattle sold - Percentage of total sales								Average weight per head sold				
	Cattle sold	Cows	Heifers	Steers	Steers	2 and over	Calves	Bulls	Total sales	Cows	Heifers	Steers	2 and over
	Number	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Pounds	Pounds	Pounds	Pounds
	Number	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Pounds	Pounds	Pounds	Pounds
1930	51.0	19.8	13.9	29.0	25.1	12.2	--	100	1,085	734	739	1,011	415
1931	58.4	32.5	5.8	2.2	39.8	19.0	0.7	100	1,002	678	682	933	383
1932	58.4	39.8	3.5	--	43.3	13.4	--	100	1,002	678	682	943	383
1933	58.7	44.4	--	3.6	39.3	12.7	--	100	983	665	670	916	376
1934	65.4	36.6	--	10.9	51.7	--	0.8	100	875	592	596	815	335
1935	47.6	33.4	14.4	20.2	27.7	4.3	--	100	972	658	662	905	372
1936	65.0	51.8	5.1	10.3	24.0	7.2	1.6	100	1,031	698	703	960	394
1937	51.5	39.2	8.3	22.7	19.7	9.9	0.2	100	1,020	690	695	950	390
1938	45.1	27.9	--	--	59.9	10.8	1.4	100	1,068	722	728	995	408
1939	45.3	39.2	--	20.1	31.4	7.0	2.3	100	991	671	676	923	379
1940	54.8	25.3	11.0	19.1	35.4	8.4	0.8	100	1,026	694	699	956	392
1941	59.4	36.1	9.1	15.9	23.9	13.9	1.1	100	1,091	738	744	1,017	417
1942	67.1	32.9	11.5	13.1	24.1	17.9	0.5	100	1,056	714	719	983	404
1943	69.5	32.2	5.9	16.8	31.8	12.1	1.2	100	1,031	698	703	960	394
1944	70.2	30.9	6.5	23.2	29.2	9.4	0.8	100	1,021	690	695	950	390
1945	69.9	38.0	8.6	18.3	24.9	9.1	1.1	100	1,037	702	707	966	397
1946	62.8	40.2	4.8	16.7	32.8	5.1	0.4	100	1,013	685	690	943	387
1947 1/	66.6	13.5	21.1	9.5	27.9	27.2	0.8	100	1,032	698	703	961	395
Average	59.3	34.1	7.2	14.0	32.9	11.1	0.7	100	1,019	689	694	949	389

1/ Preliminary.

sell on a 2-year-old steer basis except in years of poor feed supply when reductions must be made in the herd, and when both older and younger stock are frequently sold. Conditions of this kind existed during 1934-36 and sales were at a low level for several subsequent years.

Investment

Total ranch investment varied from a low of \$19,445 in 1933 to a high of \$66,606 in 1947. The trend in total ranch investment has been gradually upward since 1933, with a very sharp increase from 1946 to 1947 (table 9). Real estate values rose rapidly in the postwar period, but the large increase in investment was caused by the steep increase in livestock prices and values during the 1946-47 period.

Investment in land, buildings, and livestock averages about 90 percent or more of the total ranch investment. Investment in land and buildings is usually somewhat larger than is investment in livestock, but the relationship does not remain constant from year to year. When the general price level begins an upward trend, livestock values increase more rapidly than do land values. Conversely, when prices turn downward, livestock values fall more rapidly than do land values.

A situation in which investment in livestock exceeds investment in land is illustrated by the situation in 1941-43 (fig. 4). During this period, livestock prices continued upward and numbers of cattle reached a peak. Thereafter, livestock numbers declined slightly and investment in land became greater than investment in livestock. In 1947, owing to the sharp increase in prices of cattle, investment in livestock again overtook investment in land.

Investment in land per animal unit of cattle exhibits about the same trend as does total investment in land (table 10 and fig. 4). However, during the period 1935-39, and particularly in 1937, investment in land per animal unit rose more rapidly than did total investment in land. Following the drought years, investment in land rose only slightly whereas animal units were curtailed sharply.

At present, the total investment of \$427 per animal unit of cattle reflects the high level of income on individual cattle ranches. However, the family-operated cattle ranch has more than 90 percent equity in the ranch and the tendency is to reduce acreage slightly. On a long-time basis, the total investment per animal unit of cattle probably should remain below \$275, if the ranch was bought for investment purposes.

During the past 10 years (1938-47) total investment per animal unit averaged about \$265. This period included some war and postwar years in which investment was relatively high. Ranchers should be cautious in buying livestock ranches under present price levels, particularly if they must go into debt. Heavy mortgages contracted at present prices and investments will prove burdensome if prices decline before such obligations are largely met.

Expense and Income

Average total cash expenditure on individual family-operated cattle ranches in the Intermountain region struck a low of \$1,093 in 1933. Following 1933 cash expenditures took a general upward trend. The high for the period 1930-47 was reached in 1947 when cash expenditures amounted to \$2,736 (table 11).

The proportion that various items are of total cash expenditures has not varied greatly between years. For the period 1930-47, 39 percent of cash expenditures were for power and machinery, 22 percent for taxes, 12 percent for livestock, 10 percent for feed and seed, 7 percent for hired labor, and 5 percent each for ranch buildings and miscellaneous costs.

Cash income followed the same trend as cash expenditures. A low in cash income of \$1,966 was reached in 1933. In 1947 cash income was \$10,413, the highest for the period reported (table 12). The operator's net cash income from the ranch remained well below \$2,000 in each year from 1930 to 1940 inclusive, except for 1936 when some liquidation of

Table 9.- Investment, income and related factors. Family Operated Area Type Cattle Ranches
Intermountain Region 1930-47

Item	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947
Total land in ranch	1,244	1,180	1,216	1,215	1,199	1,236	1,275	1,369	1,520	1,595	1,662	1,720	1,735	1,703	1,697	1,713	1,698	1,623
Proportion rented	27	23	25	25	24	25	27	28	28	31	28	29	29	29	29	30	30	30
Cropland harvested	191	200	203	203	192	188	183	183	181	183	186	195	194	195	195	196	191	182
Total labor used	5,313	5,666	5,734	5,767	5,788	5,229	5,119	4,875	4,755	4,972	4,756	5,012	5,091	5,187	5,122	5,046	4,852	4,709
Labor hired	--	386	514	577	658	159	79	--	--	22	--	272	531	777	892	996	802	689
Total investment	32,101	27,592	24,246	19,445	19,789	22,900	24,344	26,177	26,624	27,782	30,073	34,590	40,125	44,884	45,800	49,955	54,833	66,606
Land and buildings	15,506	14,215	12,071	10,236	10,356	10,368	11,187	12,366	13,380	13,924	14,555	15,435	16,861	18,219	20,706	23,091	25,006	27,655
Machinery and equipment	1,548	1,563	1,481	1,369	1,313	1,254	1,265	1,334	1,433	1,434	1,490	1,630	1,816	1,922	1,954	2,001	2,365	2,548
Livestock	14,355	10,009	9,628	6,614	6,416	10,068	11,103	11,692	11,152	11,439	13,078	16,520	19,408	21,669	20,177	21,764	24,076	32,692
Feed and seed	1,692	1,805	1,066	1,226	1,704	1,000	789	785	669	985	950	1,005	2,040	3,074	2,963	3,099	3,385	3,711
Cash receipts	3,260	2,731	2,176	1,966	2,223	2,759	3,678	3,233	2,818	2,895	3,566	4,760	6,237	7,301	6,784	8,098	9,129	10,413
Cash expenditures	1,484	1,230	1,136	1,093	1,257	1,107	1,208	1,241	1,410	1,565	1,492	1,723	1,736	1,922	2,084	2,248	2,302	2,736
Net cash ranch income	1,776	1,501	1,040	873	966	1,652	2,470	1,992	1,408	1,330	2,074	3,037	4,501	5,379	4,700	5,850	6,827	7,677
Value of perquisites	397	339	278	257	298	319	341	353	341	329	335	381	501	584	584	556	634	801
Net change in inventory	716	-334	-89	-154	-1,244	-316	-848	24	554	480	366	1,209	235	-465	-374	-524	-739	391
Net ranch income	2,889	1,506	1,229	976	20	1,655	1,963	2,369	2,303	2,139	2,775	4,627	5,237	5,417	4,910	5,882	6,722	8,869
Rent and interest paid by operator	563	629	598	545	541	442	408	409	412	423	414	381	388	392	458	468	459	431
Operator's net ranch income	2,326	877	631	431	-521	1,213	1,555	1,960	1,891	1,716	2,361	4,246	4,849	5,025	4,452	5,414	6,263	8,438
Operator's net cash ranch income	1,213	872	442	328	425	1,210	2,062	1,583	996	907	1,660	2,656	4,113	4,987	4,242	5,382	6,368	7,246
Land and buildings (net rental)		643	520	440	401	385	366	388	393	398	411	434	497	542	658	695	650	656
Working assets (current interest rate)		870	791	599	566	736	789	829	795	693	776	958	1,163	1,333	1,255	1,343	1,491	1,870
Total investment		1,513	1,311	1,039	967	1,121	1,155	1,217	1,188	1,091	1,187	1,392	1,660	1,875	1,913	2,038	2,141	2,526
Operator and family labor		-7	-82	-63	-947	534	808	1,152	1,115	1,048	1,588	3,235	3,577	3,542	2,997	3,844	4,581	6,343
Operator's labor		-429	-340	-258	-1,166	302	559	881	873	787	1,325	2,943	3,217	3,108	2,538	3,411	4,104	5,833
All labor		65	-23	-11	-880	552	818	1,152	1,115	1,051	1,588	3,278	3,699	3,782	3,359	4,256	4,944	6,688
Percentage return to investment		5.6	5.4	5.3	5.4	5.0	4.7	4.6	4.5	3.9	3.9	4.0	4.1	4.2	4.2	4.1	3.9	3.8
Return per hour to all labor used		.01	-0.00	-0.00	-0.15	.11	.16	.24	.23	.21	.33	.65	.73	.73	.65	.84	1.02	1.42
Gross ranch income		68	61	54	34	67	75	86	89	89	102	151	170	179	170	197	218	279
Operator's net ranch income		105	28	19	-23	53	68	86	83	76	104	187	214	221	196	238	276	371
Total production		94	102	103	100	80	105	87	90	97	94	102	115	124	115	119	114	104
Production per hour of labor		92	93	93	90	80	106	93	99	101	103	106	118	124	117	123	122	115
Operating expense per unit of production		106	87	84	93	95	76	93	103	109	104	108	107	112	127	130	138	179
Total cost per unit of production		94	62	54	35	86	74	102	101	95	112	152	152	150	152	171	198	279
Total input per unit of production		100	96	104	103	103	78	92	103	107	104	107	101	96	103	103	103	127
Power and machinery used (quantity)		94	85	85	91	90	95	98	93	109	118	131	104	102	110	115	119	126
Prices received for products sold		107	60	51	55	85	84	99	89	98	104	124	147	161	160	176	209	251
Prices paid including hired labor wages		102	97	79	91	93	98	103	102	103	102	102	106	116	122	127	134	122

Allocation of net ranch income

Index numbers (1930-44=100)

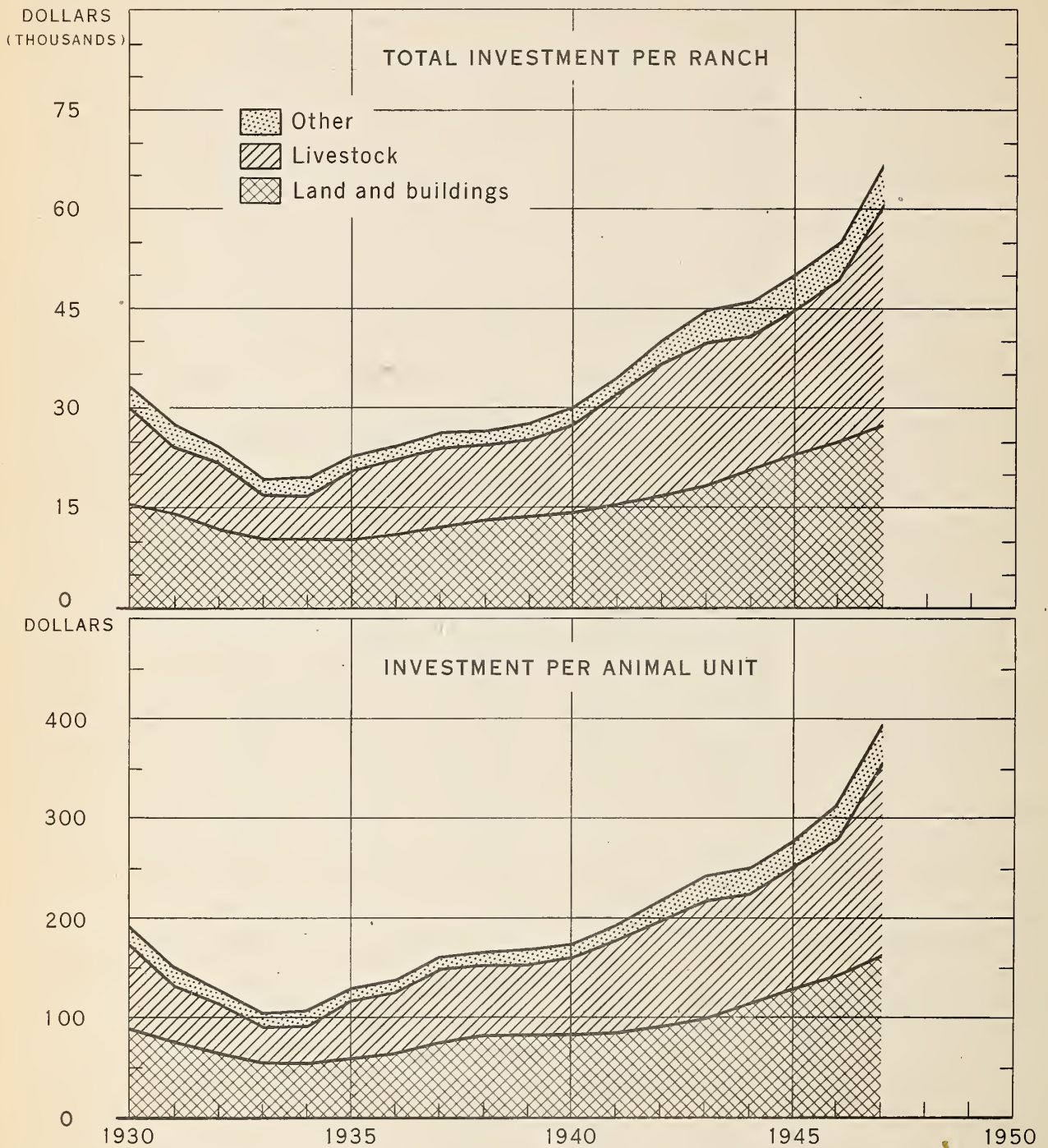
1/ Preliminary

Table 10. Average Income and Costs per Animal Unit of Cattle on Commercial Family-Operated Ranches in Intermountain Region, 1930-47

Item	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947
Cattle on ranch	Animal	157	167	171	170	167	156	159	146	144	151	164	166	167	165	162	160	156
Total land	Unit	7.9	7.1	7.1	7.2	7.2	7.9	8.0	9.4	10.6	10.6	10.5	10.5	10.2	10.3	10.6	10.6	10.4
Cropland harvested	Acres	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Other land	do.	6.7	5.9	5.9	6.0	6.0	6.7	6.8	8.1	9.3	9.4	9.3	9.3	9.0	9.1	9.4	9.4	9.2
Proportion of cash receipts from cattle:	Percent	95	92	95	89	83	80	90	89	87	90	94	91	93	94	91	89	87
Total investment	Dollars	210.82	165.22	141.79	114.37	118.49	146.79	153.10	179.29	184.95	184.00	210.93	241.71	268.76	277.59	308.37	342.71	426.94
Land and building	do.	98.76	85.12	70.59	60.21	62.01	88.19	70.35	84.69	92.91	92.22	94.12	101.57	109.09	125.50	142.54	156.29	177.27
Machinery and equipment	do.	9.86	9.36	8.66	8.05	7.86	8.04	7.96	9.14	9.95	9.50	9.94	10.94	11.51	11.84	12.35	14.79	16.33
Livestock	do.	91.43	59.93	56.31	38.90	38.42	64.15	69.83	80.08	77.44	75.76	100.74	116.91	129.75	122.29	134.35	150.47	209.55
Feed and seed	do.	10.77	10.81	6.23	7.21	10.20	6.41	4.96	5.38	4.65	6.52	6.13	12.29	18.41	17.96	19.13	21.16	23.79
Cash receipts	Dollars	19.74	15.15	12.08	10.37	11.08	14.99	21.36	20.36	17.72	17.37	27.27	34.22	41.20	38.66	45.53	51.19	58.98
Livestock	do.	1.03	.42	.37	.40	.36	.67	.67	.77	.67	.51	.58	.77	.90	1.14	1.03	1.08	1.31
Product	do.	-.52	-.78	.28	.52	1.15	1.37	.45	.42	.28	.32	.46	.36	.24	-.24	1.98	3.22	4.63
Crops	do.	-.27	-.78	-.28	-.27	.72	.66	.65	.60	.89	.97	.98	1.09	1.06	1.32	1.46	1.56	1.83
Other	do.	20.77	16.35	12.73	11.56	13.31	17.69	23.13	22.15	19.56	19.17	29.02	37.57	43.72	41.12	50.00	57.05	66.75
Total	do.	68	.76	1.16	1.50	1.77	.49	1.25	.86	.74	.82	.90	1.03	1.10	1.24	1.28	1.19	1.47
Cash expense	Dollars	1.95	.59	.42	.56	.69	.79	.36	.68	2.07	2.13	1.20	1.62	1.79	1.72	1.62	.69	1.22
Feed and seed	do.	3.62	2.98	2.26	2.21	2.80	3.29	3.52	3.99	4.38	4.38	4.95	3.87	4.04	4.54	4.92	5.34	6.72
Livestock expense	do.	.47	.27	.14	.11	.19	.32	.38	.45	.44	.40	.42	.46	.50	.54	.58	.59	.91
Power and machinery	do.	-.43	.43	.35	.31	.40	.12	.06	-.02	-.02	.02	.27	.73	1.44	2.01	2.54	2.27	2.21
Building	do.	2.33	2.06	2.08	1.52	1.50	1.79	1.73	2.16	2.24	2.25	2.27	2.19	2.05	2.02	2.27	3.39	4.24
Hired labor	do.	.40	.27	.24	.22	.17	.28	.30	.36	.38	.36	.50	.56	.59	.56	.66	.72	.77
Taxes (real and personal)	do.	9.45	7.36	6.65	6.43	7.52	7.08	7.60	8.50	9.79	10.36	10.51	10.46	11.51	12.63	13.87	14.39	17.54
Miscellaneous	do.	11.32	8.99	6.08	5.13	5.79	10.61	15.53	13.65	9.77	8.81	13.21	18.51	32.21	28.49	36.13	42.66	49.21
Total	do.	2.53	2.03	1.63	1.51	1.78	2.04	2.14	2.42	2.37	2.18	2.32	3.02	3.01	3.54	3.43	3.96	5.13
Net cash ranch income	do.	4.55	-2.00	-.52	-.90	-7.45	-2.03	-5.33	.16	3.85	3.18	7.37	1.42	-2.78	-2.27	-3.23	-4.62	2.51
Value of perquisitee	do.	18.40	9.02	7.19	5.74	.12	10.62	12.34	16.23	15.99	14.17	28.20	31.55	32.44	29.76	36.33	42.00	56.85
Net change in inventory	do.	11.90	9.06	7.67	6.11	5.79	7.19	7.25	8.34	8.25	7.23	8.49	10.00	11.23	11.59	12.59	13.38	16.19
Net ranch income	do.	2.99	2.53	1.51	1.15	1.30	1.49	1.57	1.86	1.68	1.73	1.78	2.17	2.60	2.78	2.67	2.98	3.27
Return to investment	do.	3.51	-2.57	-1.99	-1.52	-6.97	1.94	3.52	6.03	6.06	5.21	17.93	19.38	18.61	15.39	21.07	25.64	37.39
Unpaid family labor	do.																	
Return to operator's labor and management	do.																	

/ Preliminary

TOTAL INVESTMENT PER RANCH, AND PER ANIMAL UNIT, 1930-47 (FAMILY-OPERATED CATTLE RANCHES, INTERMOUNTAIN REGION)



U. S. DEPARTMENT OF AGRICULTURE

NEG. 46982 BUREAU OF AGRICULTURAL ECONOMICS

Figure 4.- Cattle ranches have little investment in assets other than livestock and land and buildings. Total investment is divided about equally between the two. These ranches have a higher proportion of the total investment in livestock and their annual returns are more directly affected by the price of cattle than are most livestock farms in the Midwest.

Table 11.- Average cash expenditures, family-operated cattle ranches,
Intermountain region, 1930-47

Year	Feed and seed bought 1/	Livestock expenses	Power and machinery	Ranch buildings	Hired labor	Taxes	Miscel- laneous costs	Total cash expendi- tures
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
1930	106	306	569	74	0	366	63	1,484
1931	127	99	498	45	72	344	45	1,230
1932	198	72	387	23	59	355	42	1,136
1933	255	95	376	18	52	259	38	1,093
1934	296	116	468	32	67	250	28	1,257
1935	78	124	514	50	18	280	43	1,107
1936	199	57	559	61	10	275	47	1,208
1937	126	99	583	65	0	316	52	1,241
1938	108	298	565	62	0	323	54	1,410
1939	124	321	662	61	3	340	54	1,565
1940	117	184	709	63	0	360	59	1,492
1941	147	197	812	69	43	372	83	1,723
1942	170	268	643	77	122	363	93	1,736
1943	184	299	675	84	240	342	98	1,922
1944	204	283	750	89	332	333	93	2,084
1945	208	263	797	94	412	368	106	2,248
1946	191	109	886	95	363	542	116	2,302
1947 <u>2/</u>	229	190	1,048	143	345	661	120	2,736

1/ Includes fees for public land grazing permits.

2/ Preliminary.

Table 12.- Cash, gross and net ranch income, family-operated cattle ranches,
Intermountain region, 1930-47
(Average per ranch)

Year	Cash sales Crops	Cash sales Livestock	Cash sales Livestock products	Govern- ment payments	Total cash income	Farm perqui- sites	Net inventory change	Gross ranch income	Net ranch income
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
1930	0	3,100	161	0	3,261	396	709	4,366	2,889
1931	130	2,531	70	0	2,731	339	-234	2,836	1,506
1932	48	2,066	63	0	2,177	277	97	2,551	1,229
1933	88	1,763	68	47	1,966	257	34	2,257	976
1934	192	1,850	61	120	2,223	298	-1,112	1,409	20
1935	214	2,339	104	103	2,760	318	-298	2,780	1,655
1936	71	3,397	106	104	3,678	341	-880	3,139	1,963
1937	60	2,973	113	88	3,234	352	-18	3,568	2,369
1938	41	2,552	97	128	2,818	341	535	3,694	2,303
1939	49	2,622	77	147	2,895	329	477	3,701	2,139
1940	72	3,265	91	138	3,566	335	333	4,234	2,775
1941	0	4,472	126	162	4,760	381	1,133	6,274	4,627
1942	225	5,682	149	181	6,237	501	331	7,069	5,237
1943	40	6,881	203	177	7,301	503	-325	7,479	5,417
1944	0	6,379	188	218	6,785	584	-295	7,074	4,911
1945	320	7,376	167	236	8,099	556	-467	8,188	5,882
1946	515	8,191	173	250	9,129	634	-695	9,068	6,722
1947 <u>1/</u>	723	9,201	205	284	10,413	801	416	11,630	8,869

1/ Preliminary.

the herd occurred. In 1941, the operator's net cash ranch income was \$2,656 and for each subsequent year except 1944 an increase was made. In 1947, this figure reached a high of \$7,246. The average return in 1947 was 44 percent above the average for the previous 5-year period and 247 percent above the average for the 1935-39 period.

Gross ranch income and operator's net ranch income also rose sharply during the war and postwar years. On an index basis (1930-44=100) the operator's net ranch income reached a high of 371 percent in 1947, 92 percent above the index of gross ranch income for that year (fig. 5). This is a reversal of the situation which existed during the 1930's when the index of gross ranch income averaged 15 percent greater than the operator's net ranch income.

The spread between prices received for products sold, and prices and wages paid explains in part the spread between gross and net income. During the 1930's the index (1930-44=100) of prices and wages paid averaged slightly more than 15 percent greater than the index of prices received. Beginning in 1940, and the upward swing of the general price level, the situation was reversed and the index of prices received rapidly outdistanced the index of prices and wages paid in the general rise in the price level.

Expenditures also rose during the 1940's but they did not keep pace with the rise in prices received or the favorable production conditions and incomes. In 1934 operating expense per dollar of gross income reached a high of 99 cents. This unfavorable situation resulted from low prices, a relatively high fixed level of operating expenses, and a near disastrous drought (fig. 6). In 1947, operating expense per dollar of gross income reached a low of 24 cents. This compares favorably with returns on other types of family-operated farms. (See F.M. 55, "Typical Family-Operated Farms, 1930-45 Adjustments, Costs, and Returns," and F.M. 70, "Farm Costs and Returns, 1945-47 Commercial Family-Operated Farms in 6 Major Farming Regions.")

In this series of analyses of family-operated farms an attempt is made to allocate net farm or ranch income to factors of production (capital and labor). The allocation is made first to land and buildings, second to working capital and third to labor and management. The residual goes to labor and management. No attempt is made in these studies to differentiate between operator's labor and operator's management.

Returns to land and buildings is generally based on weighted average rentals should the farm be rented out under common rental arrangements. Because most ranches are owner-operated and there are no alternatives in renting and no established rental rates and arrangements, returns to land and buildings on these cattle ranches are based on alternative investment opportunities. Annual returns on fixed investment in this case is current investment times the average rate of interest on farm mortgage investments.

Returns to working capital is obtained by multiplying the current investment in working assets times the average current interest rate on intermediate or production credit.

Returns to operator and family labor and management is that portion of net ranch income that remains after returns to land and buildings and to working assets have been allocated in the manner described above.

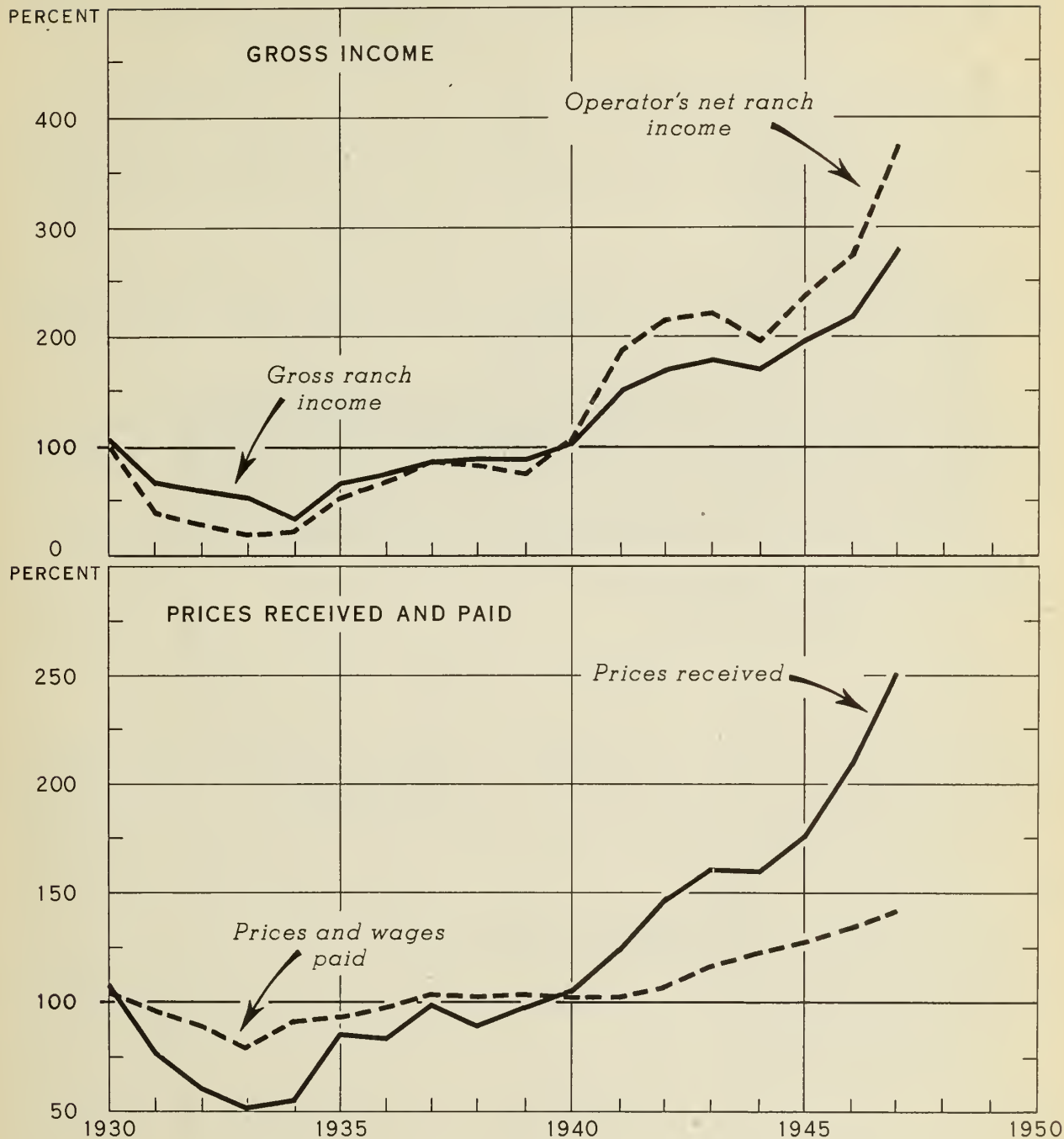
Returns to investment has risen sharply since 1940. Although the current interest rate on investment has been reduced, capital values have more than doubled. Return to labor and management has exhibited a general upward trend. Return to labor and management in 1934 was minus 15 cents an hour compared with \$1.42 an hour in 1947 (table 9).

The general income situation on family-operated cattle ranches for the 18-year period (1930-47) indicates that during the middle thirties these ranches were in a precarious position. From 1931 through 1936 the net ranch income was less than \$2,000 and in 1934 it reached a low of \$20. When the net ranch income during this period is allocated to the factors of production a distressing picture is presented. After returns to capital are allotted, returns to individual operators and their families for their labor are minus figures for the years 1931-34.

INCOME, AND PRICES RECEIVED AND PAID, 1930-47

(FAMILY-OPERATED CATTLE RANCHES, INTERMOUNTAIN REGION)

INDEX NUMBERS (1930-44=100)



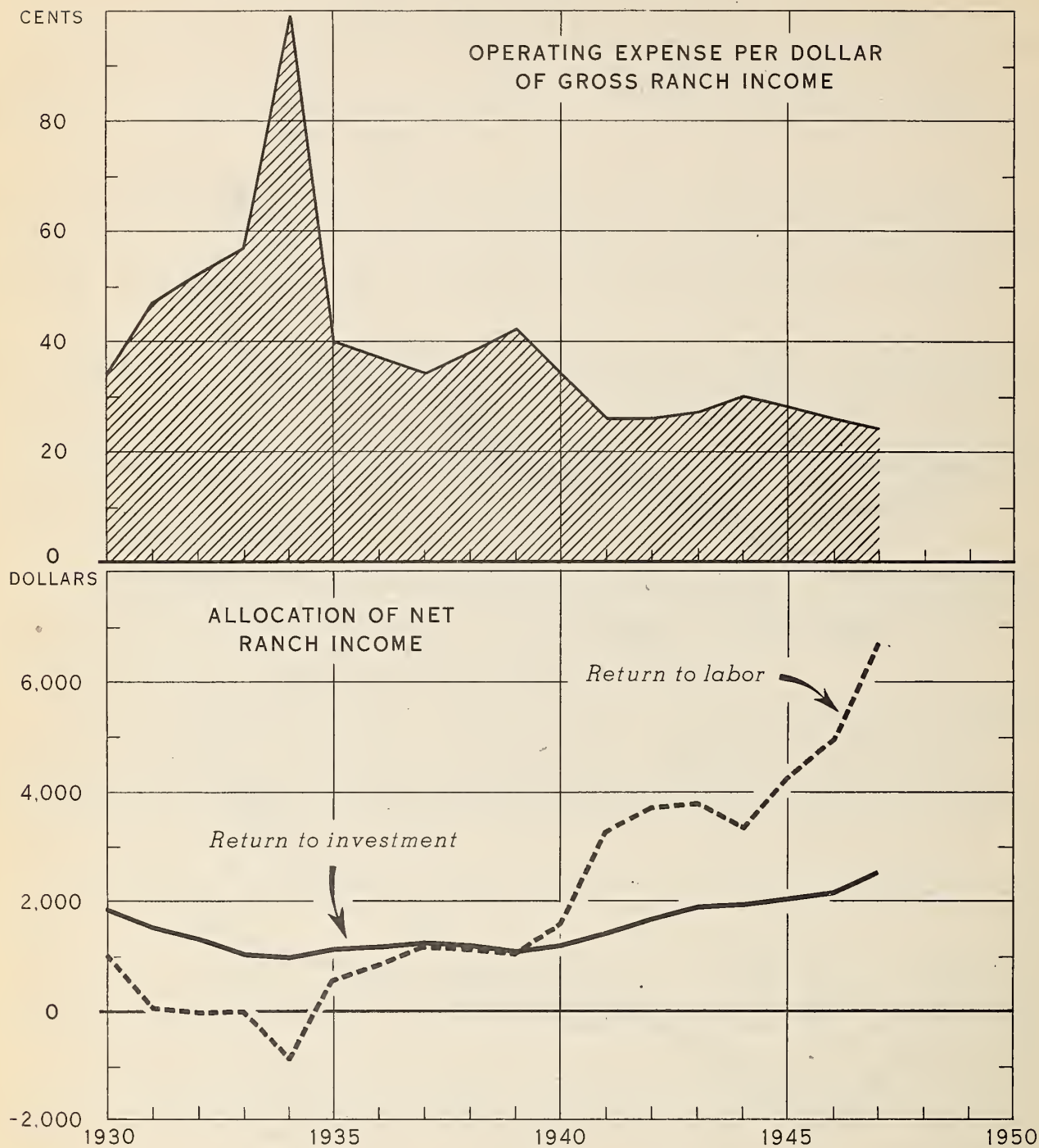
U. S. DEPARTMENT OF AGRICULTURE

NEG. 46983 BUREAU OF AGRICULTURAL ECONOMICS

Figure 5.- The index of operator's net ranch income has risen appreciably above gross ranch income since 1940. This has been due in large part to the increasing spread between prices received and prices paid.

OPERATING MARGIN, AND ALLOCATION OF INCOME. 1930-47

(FAMILY-OPERATED CATTLE RANCHES, INTERMOUNTAIN REGION)



U. S. DEPARTMENT OF AGRICULTURE

NEG. 46984 BUREAU OF AGRICULTURAL ECONOMICS

Figure 6.- Operating expense per dollar of gross income has changed little since 1940. As a result, return to investment and return to labor have about the same upward trend as gross income.

If his labor return is a minus one an operator must in some way try to meet his living costs. If he owns his capital, he can use the interest return on his investment to meet these costs. This is not always the case. In 1934 about 54 percent of his capital investment was mortgaged. Under conditions of this kind, he must allot his return on investment to the payment of mortgage interest charges. To meet his living costs and other current expenses he must borrow money or liquidate some of his capital investment. This was a necessary and painful procedure for cattle ranchers during the 1931-34 period.

Net ranch income, return to labor, and other measures of income have shown a general upward trend since the low point in 1934. The increase in income during the war years, with the exception of 1944 was gradual but nevertheless substantial. Returns to operators and to family labor followed the same pattern. However, with the cessation of wartime food controls, the net income on cattle ranches jumped from \$6,722 in 1946 to \$8,869 in 1947, an increase of 32 percent.

On an animal-unit (cattle) basis, total cash expenditures reached a low of \$6.43 in 1933 and a high of \$17.54 in 1947. Cash receipts showed the same pattern in those years with a low of \$11.56 and a high of \$66.75. Net cash ranch income varied from \$5.13 in 1933 to \$49.21 in 1947. The return to operator's labor and management per A.U. of cattle was a minus amount in the period 1931-34, but it rose to \$37.39 in 1947.

At present this segment of the cattle industry is in a very favorable income situation and it is well fortified to meet changes in the general income and price level. However, extremely unfavorable environmental conditions again could cause considerable stress. The favorable situation in 1947 was caused by a combination of high prices and a series of years favorable to the production of range and feed crops. A downward trend in precipitation and thus in quantity and quality of range forage, with no change in prices, would greatly depress incomes on cattle ranches.

One must not overlook the fact that these cattle ranchers would find themselves under considerable financial strain if prices decline and costs remain at or near present levels.

Measures of Production

For most operators, cattle ranching as a whole is a relatively long-time business venture. Particular skills are needed to organize and operate a cattle ranch and considerable time is required to build up the breeding herd. Resources required, tenure relationships, and general conditions under which cattle ranching predominates in the Intermountain region offer few alternatives. Opportunities to increase production or to change its character are also less pronounced in livestock ranching than in most types of farming, and particularly in crop farming.

Total output or production on many types of farms can be increased sharply by any number of means, such as heavier applications of fertilizer, use of improved and heavier yielding varieties of crops, better and more timely cropping practices, shifts to more productive crops, and technological changes and increased mechanization which permit operators to handle larger enterprises. (Shifts from horses and mules to mechanical power in essence increases farm output and sales through releasing horse and mule feed for direct production.) This is not the case on cattle ranches and production has neither varied as much during the period 1930-47 nor has it increased as much in recent years on cattle ranches as on crop farms. 4/

Total units of production or total quantity of production on cattle ranches rose from an index of 87 in 1937 to a high of 124 in 1943, both index numbers based on

4/ Compare results in this publication and in F.M. 55, "Typical Family-Operated Farms, 1930-45, Adjustments, Costs, and Returns." Goodsell, W. D., Jones, R. W., and Bierman, R. W. Bur. Agr. Econ., April 1946, for differences between crop and livestock farms and cattle ranches on items of income, costs and inputs per unit of production, power and machinery used, and many other factors.

1930-44=100. (See table 9.) Since 1940 this index has remained above 100 but since 1944 it has declined considerably (fig. 7). A perusal of the graphic index of total production and total input per unit of production reveals that total production has been up during the war years and that input per unit of production has exhibited no general trend above the 1930-44 average. Exception is noted for 1947 when the index of input per unit of production reached a high of 127; 24 points above 1946. The war years, with all of their attendant shortages of labor, equipment, and supplies, forced an increase in efficiency of production to which family-operated cattle ranches responded.

The index of production per hour of labor was below 100 from 1930 to 1938 inclusive with the exception of 1936. The war years brought about a firm rise in this index to a high of 124 percent in 1943. Since 1943, the index of production per hour of labor has declined to 115 percent in 1947. During the war years, operators of cattle ranches were getting the maximum production from their labor force. The labor force is still operating with greater efficiency than during the 1930's, but ranchers have dropped off somewhat from the efficient use of labor during the war years.

The index of quantity of power and machinery used reveals additional information as to reduction in postwar labor efficiency. The index of power and machinery (1930-44=100) remained below 100 until 1939, rose to 131 percent in 1941, and then dropped to 102 percent in 1943. This decline was due to wartime shortages of agricultural equipment. Since 1943, the index of quantity of power and machinery has risen to a high of 126 in 1947. Here is a situation in which more machinery and power is used, but in which production per hour of labor has declined.

Of course, much of the labor used on these ranches is for the production of livestock. Increased use of machinery reduces unit labor requirements for crops, but affects unit labor requirements for livestock very little. Operators of these cattle ranches are now finding the labor market more relaxed than during the war when they and their families, because of the shortage of labor, had to perform much of the labor. Overall management problems unattended to during times of critical shortages of labor are receiving more attention.

Animal-Unit Comparisons

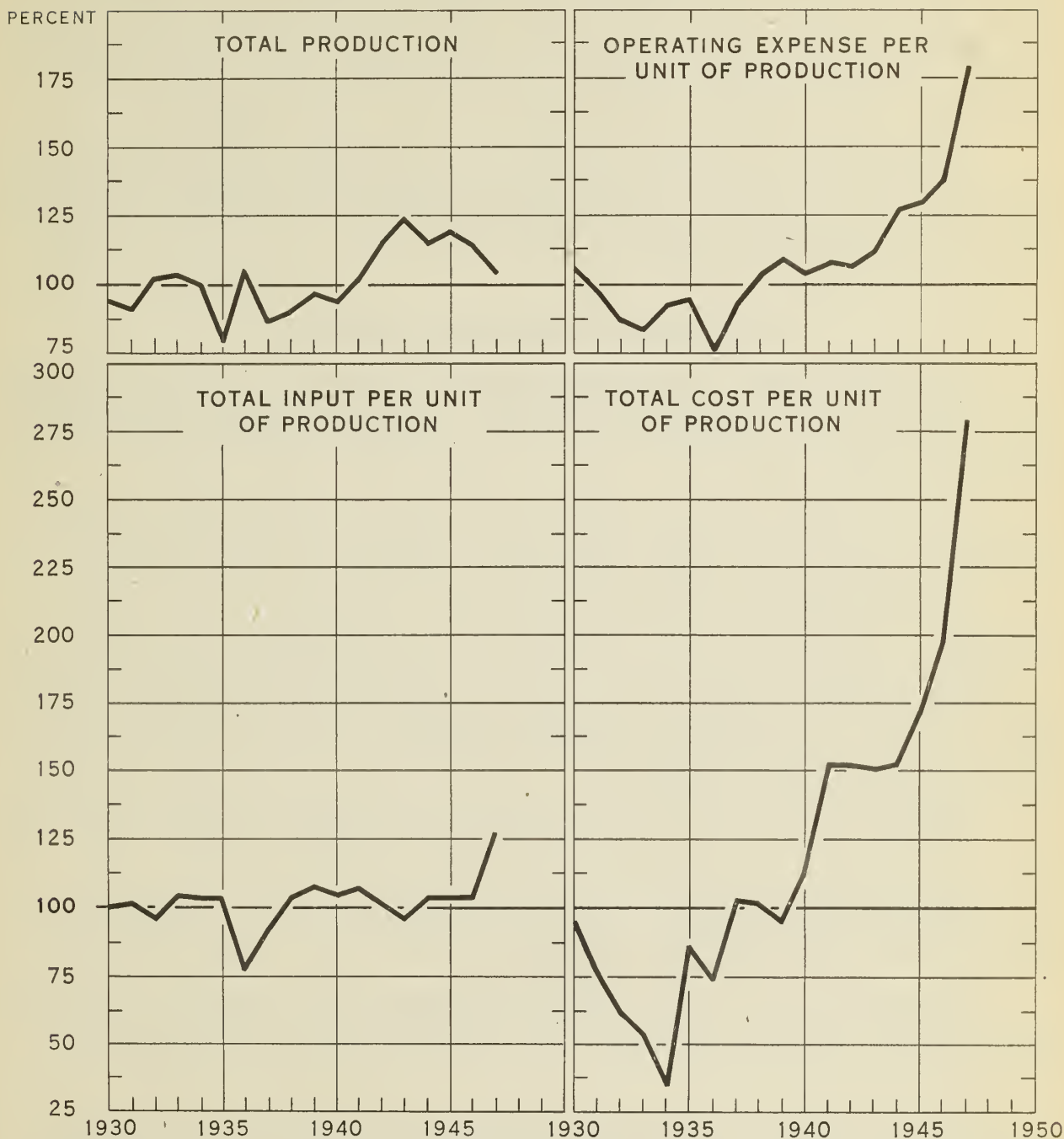
Significant items of ranch organization, costs, and returns have been calculated on a per animal-unit (cattle) basis (table 10). Many of these items are comparable to items contained in table 9 on a per ranch basis. Placing the data on a per animal-unit (cattle) basis permits a direct comparison of price, cost, and returns on a common unit. This is somewhat comparable to calculating data on crop farms on a per acre basis.

In ranch studies, direct comparisons of cost and returns per ranch as between ranches of varying size are difficult. The usual procedure is to reduce to an animal-unit basis. Table 10 permits the time series presented in this publication to be compared with other published studies of cattle ranching, if due allowance is made for size of operation.

PRODUCTION AND PRODUCTION COSTS, 1930-47

(FAMILY-OPERATED CATTLE RANCHES, INTERMOUNTAIN REGION)

INDEX NUMBERS (1930-44 = 100)



U. S. DEPARTMENT OF AGRICULTURE

NEG. 46985 BUREAU OF AGRICULTURAL ECONOMICS

Figure 7.— Total production reached a peak in 1943 with a slight decline since then. Meanwhile, total physical input per unit of production has remained relatively stable. Operating expenses show a general upward trend, but not nearly so great as total cost.

APPENDIX

Discussion of Terms Used

Although the analysis of family-operated ranches is made in considerable detail, an effort has been made to use accepted farm-management terms insofar as they are consistent and practicable for these purposes. The procedure employed (in addition to assaying and evaluating organization, operation, and income of the entire ranch operating unit regardless of ownership) is designed to evaluate and appraise the equity of the operator, the mortgagor, and the landlord, to estimate their shares of ranch income, and to appraise and allocate ranch income to resources (capital, land, and labor including management). (See statement on ranch income, page 25 and table 9, page 14.)

To clarify matters, wherever departures from the generally accepted meanings of terms have been necessary, a brief discussion is given. It should be kept in mind that all items to which these terms apply, and which are given in the tables and figures that follow, are on a per ranch basis and are limited to commercial family-operated cattle ranches in the Intermountain region.

Size, Investment, and Income - Definitions

Total land in ranch - Total acreage in crops plus acreage of failure or abandoned farm land, fallow, idle, pasture, woodland, wasteland, house yards, barnyards, feed lots, roads, lanes and fences, operated under one unit. Land that is rented from others and operated in this unit is included. Land on which more than one crop is grown during the year is only included once.

Proportion rented - The sum of the acreages rented from others by part owners and tenants expressed as a percentage of total land in ranches. It thus becomes the proportion of all land rented from others rather than the proportion of ranches rented.

Cropland harvested - Land from which cultivated crops were harvested; land from which hay (including wild hay) was harvested; and land in grain and other crops.

Total labor used - Total hours of man labor required under average rates of performance with methods and types of power and equipment used on the ranches in the production, harvesting, and marketing of crops and livestock; in maintenance and management of range and pasture; and in repair and upkeep of machinery, equipment, buildings, fences and improvements, including dwellings.

Labor hired - Total hours of labor hired during the year and for which wages were paid. It does not include family labor for which no cash wages were paid.

Total investment - Estimated current value (January 1) on the cattle ranches of land, buildings, and improvements, including dwellings; machinery and equipment; livestock; and crops, feed, seeds, and supplies.

Cash receipts - Total amount of cash received during the calendar year from sales of crops and livestock and livestock products, and from Government payments. All current marketings are included whether produced during the year or from inventories on hand January 1.

Cash expenditures - Total cash paid during the calendar year for commodities and services used in production, including all cash payments for feed, seeds, and fertilizers; livestock and livestock equipment and supplies; machinery and equipment purchases, repairs, replacements, and operations; repair and upkeep of ranch buildings excluding dwelling; custom work and hired labor; and taxes, telephone, electricity, and miscellaneous items. Rent and interest payments and additions to capital such as purchases of additional land and buildings are not included under cash expenditures. Only a part of the cash expenditure required to operate the farm automobile is included in

Example: Ranch Income Statement - Family-Operated Cattle Ranches 1946

1. CASH RECEIPTS:		
2.	Crops	\$ 515
3.	Livestock	8,191
4.	Livestock products	173
5.	Government payments and miscellaneous	250
6.	Total	\$9,129
7. CASH EXPENDITURES:		
8.	Labor hired	\$ 363
9.	Crop and livestock expense, incl. feeder cattle bought	300
10.	Machinery and power (incl. ranch share of auto)	886
11.	Building repair and replacement (excl. dwelling)	95
12.	Miscellaneous	116
13.	Taxes	542
14.	Total	\$2,302
15.	NET CASH INCOME . . (Line 6-14)	\$6,827
16. PERQUISITES:		
17.	Food (used for human consumption on ranches where produced)	\$ 397
18.	Fuel	24
19.	House rental	213
20.	Total value of perquisites	\$ 634
21.	NET CHANGE IN INVENTORY	\$ -739
22.	Net Ranch INCOME . . (Line 15 + 20 + 21)	\$6,722
<hr/>		
23.	Rent and mortgage interest paid	\$ 459
24.	Operator's net ranch income . . (Line 22-23)	\$6,263
25.	Operator's net cash ranch income	\$6,368

ALLOCATION OF NET RANCH INCOME

26.	LAND AND CAPITAL . . (Line 29 + 30)	\$2,141
27.	Gross rental value of land and buildings	\$1,075
28.	Total land and building expense ¹	425
29.	Net rent on land and buildings . . (Line 27-28)	650
30.	Interest on machinery, livestock, feed, and supplies	\$1,491
31.	OPERATOR AND FAMILY LABOR AND MANAGEMENT . . (Line 22-26)	\$4,581
32.	Unpaid family labor (at hired labor rates)	\$ 477
33.	Return to operator and management . . (Line 31-32)	\$4,104
34.	Amount paid for labor hired	\$ 363
35.	RETURN TO ALL LABOR AND MANAGEMENT . . (Line 32 + 33 + 34)	\$4,944
36.	TOTAL HOURS OF LABOR USED	4,852
37.	RETURN PER HOUR TO ALL LABOR . . (Line 35 ÷ 36)	\$ 1.02

¹ Real estate taxes and depreciation on buildings including dwelling.

cash expenditures; the remaining portion is charged to the personal account of the operator.

Value of perquisites - Value at current farm prices of all meats and meat animals, livestock products, vegetables, fruits, cereals, fuel and wood, consumed during the calendar year by members in the ranch households on ranches where produced, plus a nominal rental on ranch dwelling. The annual rental of the ranch dwelling is estimated at 12 percent of the current value of the dwelling. This approximates estimated rental rates of similar dwellings and, over the long run, it compares closely with the total annual cost of maintaining the ranch dwelling; it varies less from year to year than does the cost.

Net change in inventory - This reflects primarily the change during the calendar year in quantity of assets. Gain or loss of income solely from changes in prices of fixed and working assets is avoided by revaluing the beginning inventory of working assets at year-end prices and excluding changes in land and building values (fixed assets) from consideration in inventory (except for purposes of estimating investment). Current assets are not revalued, on the assumption that they are intended for sale, are readily salable at a market price, and in large part are disposed of during the year. The difference between current cash expenditures for machinery and current-year depreciation appears here as an inventory change. Net ranch income then reflects depreciation on working capital and ranch buildings as an operating expense.

Net ranch income - Annual return, including change in inventory and estimated value of perquisites, to the operator for his labor and management and to the unpaid members of the household for services rendered on the ranch during the calendar year, and to total ranch investment regardless of ownership. In terms of the previous criteria, it is net cash ranch income plus value of perquisites and net change in inventory.

Rent and interest paid by operator - Total weighted average value of rent (cash, cash-share, crop-share, and livestock-share rentals) paid to landlords by ranch operators plus interest paid by ranch operators on their mortgage indebtedness. It is that portion of net ranch income which goes to persons other than the farm family. Grazing fees paid for use of public lands are treated as purchased feeds in cash expenditures. Interest is the average amount of interest paid by operators during the calendar year to mortgagors.

Operator's net ranch income - The annual return, including inventory change and estimated value of perquisites, to the operator for his labor and management and return on his investment, and to unpaid members of the ranch household for services rendered on the ranch during the calendar year.

Operator's net cash ranch income - Cash receipts from ranching minus operator's cash ranch expenditures for commodities and services used in production including operator's cash outlays for feeds, seeds, and fertilizers; livestock and livestock equipment and supplies; machinery and equipment purchases, repairs, replacements, and operations; repair and upkeep of ranch buildings excluding dwelling; custom work and hired labor; and taxes, telephone, electricity, and miscellaneous items; and including rent and interest paid by the operator.

Allocation of Net Ranch Income

Net ranch income includes return to operator for his labor and management, to unpaid members of the family for services rendered, and to capital invested in land and buildings and in working assets; therefore it becomes necessary to make some division or allocation of net ranch income to obtain net return to capital and labor, including management. It seems superficial and impossible to differentiate between operator's labor and operator's management on family-operated farms or ranches; no attempt is made to do so in this report. Any reference to operator's labor here also implies management.

Land and buildings - In the Intermountain region, most range and pasture land is rented (leased) on an acre, per head, or animal-unit month basis. The most usable method of calculation of return to land and improvements is based on interest rates on ranch mortgage holdings. Therefore, the return to land and improvements is the current ranch mortgage-interest rate multiplied by the current investment in land and improvements.

Working assets - Amount of net ranch income allocated to working assets (machinery, equipment, livestock, crops, feeds, seeds, and supplies) is based on weighted average interest rates charged by commercial banks and Federal agencies on short-term loans. Allocation of income to working assets is thus obtained by multiplying the investment in these assets on January 1 by the respective interest rate.

Operator and family labor - Return to operator and family for labor and management is that portion of net ranch income that remains after returns to land and buildings and to working assets have been allocated, as described above.

Operator's labor - Return to operator for his labor and management is that portion of net ranch income remaining after returns to land and buildings and to working assets have been allocated in the way described and allowances have been made for remuneration of unpaid family labor, evaluating at hired laborer's wage rates without board. It may be calculated directly by subtracting the payment to unpaid members of the ranch family as derived above from return to operator and family labor.

All labor - Return to all labor is the remuneration for all labor and management used in production on the ranch, with due allowance for return to capital invested and all production expenses exclusive of labor and management. It is readily obtained by adding expenditures for hired labor to the return to operator and family labor.

Percentage return to investment - Rate of annual return to operator and landlord on each dollar invested in the business of the ranch as of January 1. It is obtained directly by dividing return to investment in land and buildings and working assets as defined above by total investment in farm assets and expressing the resulting ratio in percentage terms.

Return per hour to all labor used - Return to all labor is the amount of money and money equivalent available (includes perquisites and credits in inventories) for the payment for all hired labor, unpaid family labor, and operator labor and management used in production on the ranch after production expenditures other than labor have been met and appropriate credit has been made for the use of capital (land, buildings, equipment, livestock, feeds, and supplies) employed in the ranch business. It is obtained directly by dividing returns to "all labor" by "total hours of labor used."

Index Numbers of Production, Costs, and Returns

An integral part of this project is the development and construction of several series of index numbers to give summary measures of changes in several items and to permit and facilitate direct comparisons of production, prices, costs and returns. Important factors in explaining, measuring, and comparing incomes are changes in production and changes in amounts of land, labor, and capital that are employed, as well as the effectiveness with which they are utilized in production, and changes in prices and cost relationships.

In recent years, production and income have increased on nearly all farms and ranches but the extent to which they have risen and the causes for the increase differ materially from farm to farm. Some farmers and ranchers have increased production by operating more land, keeping more livestock, buying more feed, and hiring more labor. Other ranchers have increased production with substantially less labor, through the use of more machinery and equipment, and by operating more land. In some instances, substantial reductions have been made in costs of production, whereas in others costs have changed very little or have increased.

To provide a direct means of measuring the effect of production, farm practices, methods of production, mechanization, prices, costs, and related factors upon ranch income and economic well-being of ranch families, all items of expense and income (including perquisites and changes in inventory) were assigned weights, then all were appropriately combined into a series of index numbers. Prices received and prices paid by ranch operators each were weighted respectively by the quantity of the particular item sold or purchased. The formulae are weighted aggregates of actual prices and quantities. The formula for income or value is:

$$\frac{\sum q_1 p_1}{\sum q_0 p_0}; \text{ for quantity or production, } \frac{\sum q_1 p_0}{\sum q_0 p_0}; \text{ and for price, } \frac{\sum q_1 p_1}{\sum q_1 p_0}$$

where p_1 and q_1 are current-year prices and quantities, and p_0 and q_0 are weighted average prices and quantities respectively in the base years. $\sum q_0 p_0 = (\sum q_1 p_1)_0$. In most instances, weighted average prices and quantities for the period 1935-39 were employed as base weights.

The period 1930-44, although it contained depression, droughts, and war--gave reasonable average values for crop yields, crop and livestock production, mechanization, prices, income, and related items. Index numbers are available for a large number of items not presented in this report. Index numbers for a few selected items, the terms of which are discussed here, are presented on 1930-44=100 in the body of the report and on 1935-39=100 in the Appendix.

Gross income - Includes total cash receipts, Government payments, perquisites, and net inventory change in crops and livestock.

Total production - Includes all products sold, consumed, and held in inventories on the ranch, plus ranch-produced power and minus feed, seed, and livestock bought. It thus represents the total quantity of ranch products produced during the year.

Production per hour of man labor - "Total production" divided by total hours of man labor. It represents total physical output for each man-hour of labor used in production.

Operating expense per unit of production - "Cash expenditures" plus net depreciation incurred in production of each unit of product. Land and buildings, working capital, and operator and unpaid family labor charges are not included in operating expense.

Total cost per unit of production - Total ranch expense including cash operating expense, net depreciation, and imputed return to operator and family labor and investment incurred in production of each unit of product. Algebraically, it is cash expenditures plus net depreciation and imputed return to operator and family labor and to investment, divided by total gross production. Total gross production here is the sum of all products sold, consumed, and held in inventories on the ranch.

Total input per unit of production - Total cost (excluding changes in prices) of producing each unit of product. Algebraically, it is the sum of all items or units produced, each multiplied by its respective base price, divided by the sum of all items used in production, each multiplied by its respective base price; the base period is the same for both numerator and denominator. In other words, it is "total cost per unit of production" as given above, adjusted for changes in price. All costs have been adjusted for change in price level, thus the ratio of input per unit of production or output becomes a measure of physical efficiency in production.

Quantity of power and machinery used - Includes tractors, trucks, machinery and equipment, ranch-produced power, and ranch share of automobile, each reduced to its respective average value in 1935-39 and weighted accordingly by number of items. It represents the combination of machinery, equipment, and power on the ranch at 1935-39 average values.

Prices received for products sold - Refers to the weighted aggregates of actual prices received for all products sold by producers on family-operated cattle ranches. It is the sum of the prices received for each item sold in the current year, weighted by the respective quantity of the product sold in the same year, divided by the sum of the weighted base-year (1935-39) prices received for each item sold, weighted by the respective quantity of the product sold in the current year.

Prices paid including wages to hired labor - Refers to the weighted aggregates of actual prices paid by the operators for all goods and services used in production and maintenance. It is the sum of current-year prices paid, including wages, each weighted by the quantity of the respective commodities or services bought in the same year, and divided by the sum of base-year (1935-39) prices paid for each item purchased, weighted by the amount of goods and services bought in the current year. The formula for both prices paid and prices received is:

$$\frac{\sum q_1 p_1}{\sum q_1 p_0};$$

p_1 and q_1 are prices and quantities respectively in the current year, and p_0 weighted average prices in the base period 1935-39.

